

**REMARKS**

In accordance with the foregoing, the specification has been amended to improve form and provide improved correlation with the drawings and claims. Claims 1, 8, 18 and 21 are amended. Claims 1 - 29 are pending, and claims 1 – 9 and 19 – 29 are under consideration. No new matter is presented in this Amendment.

**Objection to claims 1 and 8**

At page 3 of the Office Action, claims 1 and 8 were objected to because of informalities. Claims 1 and 8 are amended herein to correct the informalities. Therefore, the objection should be withdrawn.

**Rejection of claim 18 under 35 U.S.C. §102(e) over Sheem et al.**

At page 3 of the Office Action, claim 18 was rejected under 35 U.S.C. §102(e) as being anticipated by Sheem et al. (U.S. Patent 6,355,377 B1) (hereinafter, "Sheem"). The Examiner referred to col. 7, line 51, et seq., of Sheem. For the following reasons, this rejection is respectfully traversed, and reconsideration is requested.

Claims 18 relates to a negative active material of a rechargeable lithium battery comprising a crystalline carbon core and a carbon shell coated on a surface of the crystalline carbon core, the carbon shell comprising crystalline carbon micro-particles. Sheem, at col. 7, line 51, et seq., and elsewhere, describes, a negative active material having a core and shell structure, but Sheem only describes that the carbon shell is semi-crystalline carbon. Sheem does not teach or suggest that the carbon shell contains crystalline carbon micro-particles as recited by claim 18. Moreover, the shell described in Sheem includes catalyst elements that serve as a graphitization catalyst. Claim 18 is amended herein to provide that the shell of the negative active material consists essentially of crystalline carbon micro-particles, thereby excluding the catalyst element-containing material of Sheem. Therefore, the rejection should be withdrawn.

**Rejection of claim 18 under 35 U.S.C. §102(b) over Miyabayashi et al.**

At page 4 of the Office Action, claim 18 was rejected under 35 U.S.C. §102(b) as being

anticipated by Miyabayashi et al. (U.S. Patent 5,401,598) (hereinafter, "Miyabayashi"). The Examiner referred to col. 2, line 14+ and col. 6, line 18+ of Miyabayashi. For the following reasons, this rejection is respectfully traversed, and reconsideration is requested.

Miyabayashi, at col. 2, line 14, et seq., col. 6, line 18, et seq., and elsewhere, describes a negative active material having multi-phasic structure including a surface layer and a nucleus. However, Miyabayashi does not teach or suggest that the surface layer comprises crystalline carbon micro-particles as recited by claim 18. Therefore, the rejection should be withdrawn.

**Rejection of claims 1 – 9 and 19 - 29 under 35 U.S.C. §103(a) over Sheem et al.**

Also at page 4 of the Office Action, claims 1 – 9 and 19 – 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sheem in view of Miyabayashi. Regarding claims 1, 19, 20 and 21, the Examiner alleged that Sheem teaches a negative active material having a crystalline carbon core having an intensity ratio  $Ra\ I(1360)/I(1580)$  of substantially 0.01 to 0.45, that the shell has a turbostratic or half-onion ring structure coated on the core, that the shell comprises crystalline carbon micro-particles and semi-crystalline carbon and that the shell has an intensity ratio  $Ra\ I(1360)/I(1580)$  of 0.2 or more. Regarding claims 3, 5, 23 and 25, The Examiner alleged that the carbon microparticles have a plate shape and may be natural or artificial graphite. The Examiner acknowledged that Sheem does not explicitly teach the shell having an intensity ratio  $Ra\ I(1360)/I(1580)$  of substantially 0.46 to 1.5. The Examiner alleged that Miyabayashi teaches a ratio  $Ra\ I(1360)/I(1580)$  of substantially 0.4 or more and preferably 0.9 to 1.3. The Examiner took the position that it would have been obvious to modify Sheem by employing a higher intensity ratio to obtain an electrode having an excellent balance of capacity size and charge/discharge cycle characteristics. Regarding claims 4, 9, 22, 24 and 29, the Examiner alleges that the prior art teaches or suggests the same negative active material and that the negative active material would inherently have an intensity ratio of  $I(110)/I(9002)$  of less than 0.01, a BET surface area of 2.3 to 3.6 m<sup>2</sup>/g and the instant tapping densities absent a showing that distinguishes the references. Regarding claims 2, 6 – 8 and 26 – 28, the Examiner alleged that these claims pertain to optimizable parameters for a result effective variable. For the following reasons, this rejection is respectfully traversed, and reconsideration is requested.

As discussed above, neither Sheem nor Miyabayashi describe that a shell of a core-shell

negative active material comprises crystalline carbon micro-particles as recited by independent claims 1 and 18. In particular, as noted above, Sheem, at col. 7, line 51, et seq., and elsewhere, describes, a negative active material having a core and shell structure, but Sheem only describes that the carbon shell is semi-crystalline carbon and does not teach or suggest that the carbon shell includes crystalline carbon micro-particles as recited by independent claims 1 and 18. In Sheem, the passage referred to by the Examiner (col. 5, line 7, et seq.) regarding crystalline particles relates to the structure of the core and not to the shell. Moreover, col. 6, line 17, et seq. of Sheem, referred to by the Examiner, does not mention crystalline carbon micro-particles. Similarly, regarding claims 3, 5, 23 and 25, the passage of Sheem referred to by the Examiner (col. 6, lines 10 – 12) relates to the core of the core-shell negative active material. Moreover, the shell described in Sheem includes catalyst elements that serve as a graphitization catalyst. Claims 1 and 21 are amended herein to provide that the shell of the negative active material of the present claims consists essentially of crystalline carbon micro-particles and semi-crystalline carbon, and claim 18 is amended to provide that the shell consists essentially of crystalline carbon micro-particles, thereby excluding the catalyst element-containing material of Sheem. Moreover, contrary to what is alleged by the Examiner, Miyabayashi does not describe that a shell of a core-shell particle has an intensity ratio  $R_a$  of greater than 0.4. Instead, the "greater than 0.4" amount mentioned in Miyabayashi relates to the multi-phasic structure as a whole and not specifically to the shell. Therefore, there is no basis for the Examiner's allegation that it would have been obvious to combine Sheem and Miyabayashi to provide the recited limitation of claim 1 that the shell has an intensity ratio  $R_a I(1360)/I(1580)$  of substantially 0.46 to 1.5, since Miyabayashi provides no information regarding Raman spectra data of a shell. Moreover, regarding claims 4, 9, 22, 24 and 29, as discussed above, Sheem and Miyabayashi do not teach or suggest the same negative active material, and therefore, there is no basis for the Examiner's allegation that the physical characteristics recited in claims 4, 9, 22, 24 and 29 would inherently be present in negative active material according to teachings of Sheem and Miyabayashi. Similarly, since Sheem and Miyabayashi do not teach or suggest the same negative active material, the particular physical properties recited in claims 2, 6 – 8 and 26 – 28 cannot be obtained by merely optimizing parameters of result-effective variables. Accordingly, the combination of Sheem and Miyabayashi does not teach or suggest all of the limitations of claims 1 – 9 and 19 – 29. Therefore, the rejection should be withdrawn.

**CONCLUSION:**

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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